

Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004-2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG):

R4WODR

Northern Great Plains Wooded Draws and Ravines

General Information

Contributors (additional contributors may be listed under "Model Evolution and Comments")

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Vegetation Type

Woodland

Dominant Species*

FRPE SYOC
ULAM CASP7
ACNE2 ELYMU
PRVI TORY

General Model Sources

- Literature
 Local Data
 Expert Estimate

LANDFIRE Mapping Zones

30
31

Rapid Assessment Model Zones

- | | |
|---|--|
| <input type="checkbox"/> California | <input type="checkbox"/> Pacific Northwest |
| <input type="checkbox"/> Great Basin | <input type="checkbox"/> South Central |
| <input type="checkbox"/> Great Lakes | <input type="checkbox"/> Southeast |
| <input type="checkbox"/> Northeast | <input type="checkbox"/> S. Appalachians |
| <input checked="" type="checkbox"/> Northern Plains | <input type="checkbox"/> Southwest |
| <input type="checkbox"/> N-Cent.Rockies | |

Geographic Range

Predominately west of the Missouri River in North Dakota and South Dakota, with minor extensions east of the Missouri River and south into Nebraska.

Biophysical Site Description

This PNVG occurs in major tributaries and upland drainages with extensions onto steep north-facing slope. The vegetation type is best developed in topographic conditions that favor protection from fires in the adjacent grasslands. This PNVG is heavily influenced by topographic situations that produce a combination of deeper soils, supplemental moisture from run-off and snow catchment.

Vegetation Description

Intricate mix of western grassland and shrubland species, with elements of eastern deciduous woodlands. Northern extent occasionally supports quaking aspen, while Southern extent supports Juniper species.

Disturbance Description

The Wooded Draw PNVG forms an intimate association with adjacent mixed grass prairie and shrublands where non-replacement fires are relatively frequent because of productive grass fuels and cycles of moisture and drought. Less frequent stand replacement fires were generally associated with periods of exceptionally high moisture conditions immediately followed by severe dry conditions. Native ungulates play a role in stand regeneration on sites where buffalo, deer, and elk concentrate for food, cover, and shelter. Drought and moist cycles are major factors that interact with both fire and native grazing.

Adjacency or Identification Concerns

Occurs in upland draws and ravines scattered throughout the Northern Mixed Grass prairie.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

Landscape adequate in size to contain natural variation in vegetation and disturbance regime. Western

*Dominant and Indicator Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

stands are usually relatively small (<50 acres). Larger areas, 50-100 acres, occur infrequently on the eastern edge of distribution.

Issues/Problems

Long, linear nature of distribution makes them difficult to map. Consequently, they are often listed as a complex in relatively small-scale mapping efforts.

Model Evolution and Comments

Reviewer noted that rocky mountain locust eruptions presumably occurred with severe impacts although the frequency of eruptions is unknown.

Succession Classes
Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).

Class A 8%

Early1 Open

Description

Grass/shrub mix on all sites that include post-replacement fire regrowth of graminoids and clonal shrubs. Includes recruitment of grass and forb species dependent upon replacement fire. Dominant species include green needle grass, western wheatgrass, western snowberry, chokecherry, and cudweed. Shrub cover is less than 25% with greater than 75% herbaceous cover. Continuity with adjacent grasslands is reestablished with replacement fires that occur in classes B, C, D, and E that kills the majority of woody vegetation and other fire sensitive species, but leaves clonal shrubs and most herbs intact. Grassland continuity is then maintained by frequent (10 years) non-replacement fires that leave belowground vegetative structures undamaged.

Indicator Species* and Canopy Position

PASM All
 NAVI4 All
 SYOC Low-Mid
 PRVI Low-Mid

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	80 %
Height	Herb Short <0.5m	Shrub Short 0.5-0.9m
Tree Size Class	no data	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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Class B 25%

Early2 All Structures

Description

In the absence of all fires, shrubs become more diverse (additions of juneberry, currents, and rose species) and dominant in both height and density with a complex herbaceous understory. Tree seedlings (green ash, American elm, and boxelder) are included in shrub cover mix. Shrub cover is greater than 25% with herbaceous cover that ranges from 25 to 50%. Cumulative soil moisture increases due to enhanced snow catchment from higher shrub and herb cover compared to post-replacement class. Successional progression may be slowed by heavy grazing by native ungulates and dry conditions (Option1).

Indicator Species* and Canopy Position

PRVI Mid-Upper
SYOC Low-Mid
FRPE Low-Mid
NAVI4 Lower

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	75 %	100 %
Height	Herb Short <0.5m	Shrub Medium 1.0-2.9m
Tree Size Class	Seedling <4.5ft	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class C 12%

Mid1 All Structures

Description

Tree species dominated by green ash and American elm begin to overtop the taller shrubs of chokecherry and juneberry, which, in turn, overtop shorter shrubs such as western snowberry. Collectively, this produces vegetation layers consisting of short shrubs and herbs (< 1 m), mid-height shrubs (1-2 m), and tall shrub/tree saplings (> 3 m). Vegetation structure further improves snow catchment while reducing water runoff and increases infiltration. The diverse vegetation structure associated with this class breaks the continuity with adjacent grasslands, which is maintained by the topographic conditions that characterize the vegetation type.

Indicator Species* and Canopy Position

FRPE Upper
PRVI Mid-Upper
AMAL2 Middle
SYOC Lower

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	30 %
Height	Shrub Medium 1.0-2.9m	Tree Regen <5m
Tree Size Class	Sapling >4.5ft; <5"DBH	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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Class D 53%

Late1 All Structures

Description

Tree species mature and canopy cover increases and becomes interlocking. Typical western woodland understory vegetation is fully developed with low to moderate foliar cover of herbaceous vegetation. Overall vegetation layers (tree, tall shrub, short shrub, and herbaceous) are maintained. Western snowberry is primarily restricted to the fringes of the class.

Indicator Species* and Canopy Position

FRPE Upper
PRVI Middle
SYOC Low-Mid
CASP7 Lower

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	30 %	80 %
Height	Tree Short 5-9m	Tree Medium 10-24m
Tree Size Class	Medium 9-21 "DBH	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class E 2%

Late2 Closed

Description

In the long-term absence of stand replacement fires, regeneration of deciduous trees and shrubs is severely reduced, which enhances establishment and persistence of juniper (primarily Rocky Mountain Juniper).

Indicator Species* and Canopy Position

JUSC2 Upper
FRPE Mid-Upper
SYOC Lower
ORMI2 Lower

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	80 %	100 %
Height	Shrub Tall >3.0 m	Tree Short 5-9m
Tree Size Class	Pole 5-9" DBH	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Disturbances

Non-Fire Disturbances Modeled

- Insects/Disease
- Wind/Weather/Stress
- Native Grazing
- Competition
- Other: grazing and drought together
- Other:

Fire Regime Group: 1

- I: 0-35 year frequency, low and mixed severity
- II: 0-35 year frequency, replacement severity
- III: 35-200 year frequency, low and mixed severity
- IV: 35-200 year frequency, replacement severity
- V: 200+ year frequency, replacement severity

Fire Intervals (FI):

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class. All values are estimates and not precise.

Historical Fire Size (acres)

Avg: 50
Min: 5
Max: 100

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Sources of Fire Regime Data	<i>Avg FI</i>	<i>Min FI</i>	<i>Max FI</i>	<i>Probability</i>	<i>Percent of All Fires</i>	
<input type="checkbox"/> Literature	<i>Replacement</i>	45	30	100	0.02222	38
<input type="checkbox"/> Local Data	<i>Mixed</i>	94			0.01064	18
<input checked="" type="checkbox"/> Expert Estimate	<i>Surface</i>	40			0.025	43
	<i>All Fires</i>	17			0.05786	

References

Butler, J. and H. Goetz. 1984. The influence of livestock on the composition and structure of green ash communities in the Northern Great Plains. In: *Wooded Draws: Characteristics for the Northern Great Plains*. Proc. Ann. Meet. Wildlife Resources Com., Great Plains Agric. Publication #111 Dept. of Biology, SDSM&T, Rapid City

Butler, J.L. H. Goetz and J.L. Richardson. 1986. Vegetation and soil-landscape relationships in the North Dakota Badlands. *American Midland Naturalist*. 116:378-386.

Girard, M.M., H. Goetz, and A.J. Bjugstad. 1989. Native woodland habitat types of southwestern North Dakota. Research Paper RM-281. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 36 p.

Godfread, C. 1994. The vegetation of the Little Missouri Badlands of North Dakota. In *Proceedings of the Leafy Spurge Strategic Planning Workshop*, March 29-30, Dickinson, ND. Pp 17-24.

Hansen, P.L., G.R. Hoffman, and A.J. Bjugstad. 1984. The vegetation of Theodore Roosevelt National Park, North Dakota: A habitat type classification. U. S. Dep. Agric., For. Serv., Rocky Mt. For. and Range Exp. Sta., Gen. Tech. Rep. RM-113. Fort Collins, Colo. 35 p.

Hansen, P.L., G.R. Hoffman, and G.A. Steinauer. 1985. Upland forest and woodland habitat types of the Missouri Plateau, Great Plains Province. In: Noble, D.L.; Winokur, R.P., eds. *Wooded draws: characteristics and values for the northern Great Plains: Proceedings of the symposium*; 1984 June 12-13; Rapid City, SD: South Dakota School of Mines and Technology: 15-26.

Hansen, P.L., K. Bogs, R.Pfister, and J. Joy. 1990. Classification and management of riparian and wetland sites in central and eastern Montana (Draft version 2). Montana Riparian Association, Montana Forest and Conservation Experiment Station, School of Forestry. University of Montana, Missoula, MT. 279 p.

Hansen, P.L. and G.R. Hoffman. 1988. The vegetation of the Grand River/Cedar River, Sioux, and Ashland Districts of the Custer National Forest: a habitat type classification. USDA Forest Service General Technical Report RM-157, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

Mack, S.E. 1981. Hardwood ravines and associated vegetation in west-central North Dakota. M.S. thesis. North Dakota State University, Fargo. 168 p.

Wali, M.K., K.T. Killingbeck, R.H. Bares, and L.E. Shubert. 1980. Vegetation-environment relationships of woodland and shrub communities, and soil algae in western North Dakota. Report of a project of the North Dakota Regional Environmental Assessment Program. ND REAP Project No. 7-01-1. Department of Biology, University of North Dakota, Grand Forks, ND.